

SOLID-STATE GYROSCOPES AND PLANAR THREE-AXIS INERTIAL MEASUREMENT UNIT

ABSTRACT OF THE DISCLOSURE

The present invention relates to a z-axial solid-state gyroscope. Its main configuration is manufactured with a conductive material and includes two sets of a proof mass and two driver bodies suspended between two plates by an elastic beam assembly. Both surfaces of the driver bodies and the proof masses respectively include a number of grooves respectively perpendicular to a first axis and a second axis. The surfaces of the driver bodies and the proof masses and the corresponding stripe electrodes of the plates thereof are respectively formed a driving capacitors and a sensing capacitors. The driving capacitor drives the proof masses to vibrate in the opposite direction along the first axis. If a z-axial angular velocity input, a Coriolis force makes the two masses vibrate in the opposite direction along the second axis. If a second axial acceleration input, a specific force makes the two masses move in the same direction along the second axis. Both inertial forces make the sensing capacitances change. Two z-axial solid-state gyroscopes and two in-plane axial gyroscopes can be designed on a single chip to form a complete three-axis inertial measurement unit.